

APPENDIX D: BEST MANAGEMENT PRACTICES (BMPs)

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5. Steps to Reduce Pollution

5.1. What Are Best Management Practices?

The General Industrial Activity Permit requires LLNL to describe storm water management controls appropriate for the facility, including BMPs. The BMPs must reduce the contamination or potential for contamination of storm water. BMPs can be simple and low cost--such as keeping work areas clean and free of debris--or expensive, such as installing structural controls. Most of the BMPs discussed in this chapter have been previously implemented at LLNL as required by ES&H regulations, or as prudent practices. Appendix C, Table C-1 summarizes activities potentially contributing contaminants to storm water discharges and BMPs to minimize the impacts of these activities on storm water discharges.

The General Industrial Activity Permit requires LLNL to describe BMPs in the following areas:

- 1. Preventative Maintenance:** Preventative maintenance involves inspection and maintenance of storm drain system devices and inspection and testing of plant equipment and systems that could fail and result in discharges of pollutants to storm water.
- 2. Good Housekeeping:** Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Materials handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm drain system.
- 3. Spill Prevention and Response:** Areas where significant materials can spill into, or otherwise enter, the storm drain systems and their accompanying drainage points shall be identified. Specific material handling procedures, storage requirements, and clean-up equipment and procedures shall be identified, as appropriate. Internal reporting procedures for spills of significant materials have been established.
- 4. Storm Water Management Practices:** Storm water management practices are practices other than those that control the source of pollutants. They shall include measures such as installing oil and grit separators, diverting storm water into retention basins, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharge shall be implemented.
- 5. Erosion and Sediment Controls:** The SWPPP shall identify measures to reduce sediment in storm water discharges.
- 6. Employee Training:** Employee training programs shall inform all personnel responsible for implementing the SWPPP of spill response, good housekeeping, and materials management practices. Training shall be updated periodically.
- 7. Inspections:** All inspections, visual observations, and sampling, as required by Section B of the General Permit, shall be done by trained personnel. A tracking or follow-up procedure should be used to ensure identified deficiencies are corrected.

5.2. BMPs for Specific Activities

This section describes the BMPs LLNL has in place to minimize the impact of activities described in Chapter 3 on storm water discharges. BMPs were selected from *California Storm Water Best Management Practice Handbooks* (Stormwater Quality Task Force, State of California, 1993) and evaluated for applicability to those activities at the Livermore Site. In addition to BMPs identified in the storm water handbook, this SWPPP establishes BMPs for activities unique to the Livermore Site. The format of this section follows the format of the *California Storm Water Best Management Practice Handbooks*.

5.2.1. Activity: NON-STORM WATER DISCHARGES TO DRAINS

DESCRIPTION Eliminate non-permitted, non-storm water discharges to the storm drain system. Non-storm water, non-permitted discharges may include: eye wash and safety showers, process wastewaters, cooling waters, fire system pump tests, wash waters, sanitary wastewater, and process wastewater. These discharges will be eliminated by either obtaining the appropriate discharge permit or by physically eliminating the discharge.

Each Associate Director is responsible for ensuring that all the Directorate's facility connections to the storm drain system are proper. Each Associate Director will annually certify that the Directorate has a mechanism in place to ensure that all non-permitted, non-storm water discharges to the storm drain system have been eliminated. Chapter 3 describes the mechanisms available through Plant Engineering to each Directorate for making this evaluation, if Plant Engineering has performed work impacting drain connections. **APPROACH** The following approaches are used to identify non-storm water discharges and ensure all connections are proper:

- Database to track changes to building drains to be fully implemented by 1995. This database is maintained by Plant Engineering for all work it performs. The database will be available for use by each Directorate.
- Visual Inspection
 - Inspect each discharge point during dry weather
- Piping Schematic Review of "As-Built" Drawings
 - The piping schematic is a map of pipes and drainage systems used to carry wastewater, cooling water, and sanitary wastes, etc.
 - A review of the "as-built" piping schematic is a way to determine if there are any connections to the storm drain system.
 - Inspect the path of floor drains in older buildings.
- Smoke Testing of Sanitary Sewer Lines
 - Smoke testing of wastewater collection systems is used to detect connections between the storm water and wastewater collection systems.

- **Dye Testing**
 - A dye test is performed by releasing a dye into either the sanitary or process wastewater system and examining the discharge points from the storm drain system for discoloration.
- **Remote Camera Inspection of Sanitary Sewer Lines**
 - A remote camera is used to visually identify cracks, offsets, etc., in the sanitary sewer line.
- **Maintain and Repair Storm Drain System**
 - The Plant Engineering, Maintenance and Operations Department Head is responsible for ensuring the storm drain system is maintained and repaired.
- **Repair or Permit Inappropriate Connections to the Storm Drain System**
 - The Environmental Protection Department Head will ensure NPDES permits are obtained, where appropriate, for all continued discharges of non-storm water to the storm drain system that were identified in the 1992 Building Drain Investigation Project. These discharges are scheduled to be covered by a NPDES permit by September 30, 1995. If not permitable under NPDES, non-storm water discharges will be eliminated through the Building Drain Repair Project by September 30, 1995. LLNL will continue to either permit or eliminate newly identified connections not appropriate for discharge to the storm drain system.

SC1

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5.2.2. Activity: **VEHICLE AND EQUIPMENT FUELING**

DESCRIPTION Prevent fuel spills and leaks and reduce their impacts to storm water. The approach listed below is currently in place. The Fleet Management Group in Business Operations is responsible for ensuring the operations are conducted at the Building 611 maintenance area following the approach identified below. The Plant Engineering Maintenance and Operations Department Head is responsible for ensuring this approach is followed for mobile fueling operations. **APPROACH**

Pave central automotive vehicle fueling areas with concrete, prevent storm water run-on, and cover the fueling area. In satellite areas, apply surface sealant to paved areas where covering is not feasible.

Install vapor recovery nozzles to help control drips as well as air pollution.

Discourage "topping-off" of fuel tanks.

Provide spill response training for personnel who handle hazardous materials. Post proper fueling instructions (e.g., EP0006, HS4240, HS4246, HAZWOPER).

Equip areas with spill kits containing dry, absorbent materials for clean-up of spills.

Develop and implement spill response plans (e.g., SPCC Plan).

Maintain on-site, 24-hour spill response team.

Dispense fuel for vehicles at designated fueling sites.

If fueling is necessary near storm drains, provide temporary protection of storm drains (e.g., temporary placement of absorbent pigs).

Prohibit unattended fueling operations except: (1) at Motor Pool (Building 611) where automatic shut-off valves are in place, and (2) at the natural gas fueling station (Lot F2) when it comes into operation, where a disconnect preventative system is in place.

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5.2.3. Activity: VEHICLE AND EQUIPMENT WASHING AND STEAM CLEANING

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment washing and steam cleaning. The Fleet Management Group Leader of Business Operations and the Maintenance and Operations Department Head of Plant Engineering are responsible for assuring that the approach below is followed at designated wash areas. Each Associate Director is responsible for ensuring that programmatic personnel do not wash equipment or vehicles outside designated areas. **APPROACH**

Use designated wash areas for vehicle and equipment cleaning (where practical) to prevent discharge to the storm drain system. Clearly designated wash areas should have the following characteristics:

- Paved with concrete
- Sloped for wash water collection
- Plumbed discharge to the sanitary sewer through an oil/water separator and permitted by the Livermore Water Reclamation Plant (LWRP).

Do not permit steam cleaning wash water to enter the storm drain.

Wash concrete and gardening equipment in designated contained percolation area (using no soaps or detergents). Trimmings and debris are to be removed and properly disposed of after they are dried.

Instructions are posted for proper use of cleaning equipment.

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5.2.4. Activity: VEHICLE AND EQUIPMENT MAINTENANCE AND REPAIR

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment maintenance and repair by running a dry shop. The approach outlined below is currently in place. The Fleet Management Group of Business Operations is responsible for ensuring fleet maintenance operations are conducted at the Building 611 maintenance area following the approach identified below. The Maintenance and Operations Department Head in Plant Engineering is responsible for ensuring this approach is followed for vehicle and equipment maintenance and repair conducted by Plant Engineering. Each Associate Director is responsible for ensuring equipment maintenance and repair not conducted by Plant Engineering and performed in his or her Directorate follows the approach outlined below. **APPROACH**

Prevent excessive build-up of oils and grease on equipment.

Use drip pans or containers under equipment that might leak.

Perform equipment and vehicle maintenance in designated areas that are designed to prevent discharges to the storm drain system, or use drip pans or containers for vehicles and equipment that might drip.

Inspect vehicles and equipment on a routine basis (such as during scheduled maintenance) for leaks.

Use secondary containment for hazardous liquid products and wastes that may enter the environment.

Do not pour materials down drains or hose down work areas; encourage the use of dry sweeping.

Clean small spills with rags, perform general clean-up with damp mops and larger spills with absorbent material.

Minimize the use of toxic solvents. Use environmentally approved substitutes whenever practical.

Make sure oil filters are completely drained and crushed before recycling.

Clean maintenance area storm drain inlets regularly.

Collect and properly manage (dispose of or recycle) used greases, oil, oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids.

Train employees on proper procedures.

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5.2.5. Activity: TRANSPORTATION AND LOADING/UNLOADING OF INDUSTRIAL MATERIALS AND WASTE

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from transportation and outdoor loading/unloading of materials. The approach listed below is currently in place. The Transportation Group Leader for Business Operations and each Associate Director is responsible for ensuring that this approach is followed in areas within their areas of responsibility. **APPROACH**

Cover major, long-term, hazardous material outdoor storage areas to reduce exposure of materials to rain.

Clean up spills immediately.

Equip vehicles used for the hazardous waste run with spill kits as required in the OSP.

Provide spill response training for personnel who handle hazardous materials (e.g., EP0006, HS4240, HS4246, HAZWOPER).

Maintain site-wide, 24-hour spill response capability.

Require training for forklift operators.

Ensure LLNL loading and tie-down requirements are met.

Provide safe driver training for delivery truck drivers and loading/unloading equipment operators.

Park tank trucks or delivery vehicles away from unprotected storm drains or manholes, or provide temporary protection.

Use drip pans under hose connections.

Design major loading/unloading areas to prevent storm water run-on:

- Use grading or berming.
- Position roof downspouts to direct storm water away from loading/unloading areas.

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5.2.6. Activity: OUTDOOR CONTAINER STORAGE OF LIQUIDS

DESCRIPTION Liquid product and waste storage containers are protected from rainfall, run-on, run-off, and wind dispersal by several methodologies. It is the responsibility of each Associate Director to ensure that these BMPs are followed. Containers that are drum-size and smaller are typically stored in portable weatherproof storage buildings where practical. These buildings typically provide secondary containment and when required, protection from fire. In other areas use Ramada-type roof structures. **APPROACH**

Protect materials from rainfall, run-on, run-off, and wind dispersal by using one or more of the following or equivalent approaches where practical.

- Store materials indoors
- Cover the storage area with a roof
- Minimize storm water run-on by enclosing the area or other similar mechanism
- Use "storage sheds" for storage of liquid containers
- Use covered dumpsters for waste product containers

Provide oil product and waste tanks that are 660 gallons or larger, or are located in environmentally sensitive areas, with secondary containment.

Provide all other tanks (except water tanks) and containers with compatible secondary containment in the form of impervious berms, dikes, and pallets with basins in case of leaks.

Store liquids to meet federal, state, and local requirements for storage of oil and hazardous materials including: secondary containment, spill response, contingency plans, employee training, segregation of incompatible material, recordkeeping, and inspections (e.g., EP0006, HS4240, HS4246, HAZWOPER).

Provide training on proper storage and spill response for personnel who handle hazardous materials (e.g., EP0006, HS4240, HS4246, HAZWOPER).

Provide 24-hour spill response. LLNL has a well-equipped fire department with hazardous materials response capabilities that can respond quickly to an emergency involving outdoor storage of liquids.

Store reactive, or ignitable materials in accordance with fire codes.

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5.2.7. Activity: OUTDOOR PROCESS EQUIPMENT OPERATIONS AND MAINTENANCE

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from outdoor process equipment operations and maintenance by reducing the amount of waste created; enclosing or covering all or some of the equipment and installing secondary containment where practical; and training employees. It is the responsibility of each Associate Director to ensure BMPs are followed in the areas of his or her responsibility. **APPROACH**

Alter the activity to prevent exposure of pollutants to storm water, if practical:

- Perform the activity during dry periods only;
- Minimize the use of toxic solvents and use environmentally approved substitutes whenever practical.

Minimize contact with storm water through berming and drainage routing to prevent run- on when practical.

Develop and implement spill response plans (e.g., SPCC Plan).

Provide spill response training for personnel who handle hazardous materials (e.g., EP0006, HS4240, HS4246, HAZWOPER).

Move activities indoors when practical.

Collect effluent streams and manage per LLNL policies, which include connecting to retention tanks, containerizing, or connecting process equipment areas to the sanitary sewer (if permitted by the Livermore Water Reclamation Plant).

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5.2.8. Activity: OUTDOOR STORAGE OF RAW MATERIALS, PRODUCTS, AND BY-PRODUCTS

DESCRIPTION Raw materials, products, and by-products that are hazardous and have the potential to become mobile are typically protected from rainfall, run-on, run-off, and wind dispersal by the approach described below. It is the responsibility of each Associate Director to ensure that these BMPs are followed in the areas of his or her responsibility. **APPROACH**

Protect materials and products from rainfall run-on, run-off, and wind dispersal with one or more of the following where practical.

- Store materials indoors
- Cover with a roof, place in a storage shed, or cover temporarily (e.g., tarps)
- Provide secondary containment
- Minimize run-on

Inspect hazardous and mixed waste storage containers to detect any signs of deterioration and remedy as needed.

Parking lots or other surfaces near bulk materials storage areas should be swept periodically to remove debris blown in from storage area.

Provide spill response training for personnel who handle hazardous materials (e.g., EP0006).

Provide 24-hour emergency response. LLNL has a well-equipped fire department with hazardous materials response capabilities that can respond quickly to an emergency involving outdoor storage of materials.

Keep liquids in designated areas.

Keep outdoor storage containers in good condition.

Develop and implement spill response plans (e.g., SPCC Plan).

Slope bulk storage areas to prevent ponding, especially where pollutants can be leached (e.g., compost, logs, and wood chips).

Store idle equipment under cover where practical.

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5.2.9. Activity: WASTE HANDLING AND DISPOSAL

DESCRIPTION Prevent the discharge of pollutants to storm water from waste handling and disposal by tracking waste generation, storage, and disposal; reducing waste generation and disposal through source reduction, re-use, and recycling; and preventing run-on and run-off from waste management areas. Management of the major hazardous waste treatment, storage, and disposal facilities is the responsibility of the Hazardous Waste Management Division Leader in the Environmental Protection Department. The responsibility of managing WAAs and other waste handling areas is the responsibility of each Associate Director owning the facility. **APPROACH**

Provide training and supervision for all waste generators in proper waste handling practices (e.g., EP0006, HAZWOPER).

Provide secondary containment for chemical hazardous waste containers and hazardous waste retention tanks.

Inspect (at least monthly or as required by state and local regulations) waste containers and waste retention tanks for signs of deterioration and remedy as needed.

Routinely inspect waste management areas for spills and leaks.

Develop and implement spill response plans for LLNL, including specific plans for WAAs, recycling, and hazardous waste management facilities.

Equip hazardous materials storage areas with spill kits containing dry absorbent materials to contain, collect, and store spilled materials.

Use only LLNL-approved containers for containment of hazardous waste, radiological waste, mixed waste, and biohazardous waste.

Containerize purge water from environmental investigations and environmental monitoring activities and manage according to guidance provided by the U.S. EPA, Department of Toxic Substances Control of the California EPA, and the Regional Water Quality Control Board.

Maintain hazardous materials usage inventory to limit waste generation (e.g., ChemTrack).

Maintain an active waste minimization program (e.g., material substituting, recycling, process modification, etc.).

Track hazardous, radiological, mixed, and biohazardous waste.

Segregate and separate waste by compatibility.

Cover/enclose or berm wastewater management areas whenever practical to prevent contact with run-on or run-off.

Equip waste transport vehicles with appropriate anti-spill cleanup equipment.

Minimize spills and fugitive losses from waste loading systems.

Minimize sediments or wastes from being tracked off site.

SC9

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5.2.10. Activity: MANAGEMENT OF CONTAMINATED OR ERODIBLE SURFACE AREAS

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from contaminated or erodible surface areas by leaving as much vegetation on site as possible (without obstructing flood control design peak flows), minimizing soil exposure time, stabilizing exposed soils, and preventing storm water run-on and run-off. It is the responsibility of the Plant Engineering Associate Director to ensure that the approach described below is followed. **APPROACH** This BMP addresses soils that are not so contaminated as to exceed criteria (see Title 22, California Code of Regulations for Hazardous Waste Criteria), but the soil is eroding and carrying pollutants off in the storm water.

Contaminated or erodible surface areas include, but are not limited to, the following controls as necessary: Preservation of natural vegetation wherever practical.

Segregation of contaminated soils in disturbed areas and place in protected piles to prevent run-on and run-off.

Re-vegetation as soon as practical (hydroseeding, landscaping).

Use chemical stabilization.

Removal of contaminated soils or where practical, bioremediation.

Use geosynthetics as appropriate.

For a quick reference on disposal alternatives for specific wastes, see Table C-2.

SC10

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5.2.11. Activity: **BUILDING AND GROUNDS MAINTENANCE**

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from building and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the storm drain system. The approach outlined below is already implemented. The Plant Engineering Maintenance and Operations Department Head is responsible for ensuring building and grounds maintenance are conducted in a manner consistent with this approach. **APPROACH**

Preserve native vegetation where practical to reduce water, fertilizer, and pesticide needs.

Use EPA-approved pesticides and fertilizers in landscaping.

Routinely clear storm drainage system as needed.

Routinely dry sweep paved areas.

Dispose of wastes properly and prohibit non-permitted, regulated wastewaters from entering ground and drains.

For a quick reference on material handling alternatives, see Table C-2.

SC11

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5.2.12. Activity: BUILDING REPAIR, REMODELING, AND CONSTRUCTION

DESCRIPTION Prevent or reduce the discharge of pollutants to storm water from building repair, remodeling, and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees. It is the responsibility of the Plant Engineering Associate Director to ensure this approach is followed for work performed by Plant Engineering. Each Associate Director of a Directorate not using Plant Engineering services is responsible for ensuring that the Directorate staff follow this approach. **APPROACH** Where practical and applicable, follow the *Construction Activity Best Management Practice Handbooks*, (Stormwater Quality Task Force, State of California, 1993) as amended by LLNL. These include, but are not limited to:

Use soil erosion control techniques where practical on erodible soils if bare ground is temporarily exposed.

Use permanent soil erosion control techniques in areas where buildings are removed and not replaced. See SC10 (Contaminated or Erodible Surface Areas).

Enclose painting operations, as appropriate to be consistent with local air quality regulations and OSHA. Properly store materials that are normally used in repair and remodeling (e.g., paints, solvents).

Cover materials of particular concern that are exposed to weather (e.g., soil piles, chemical storage, paints, etc.), especially during the rainy season.

Properly store and dispose of waste materials generated from the activity. See CA20, *California Storm Water Best Management Practice for Construction Activity Handbook* (Stormwater Quality Task Force, State of California, 1993).

Provide spill response training for personnel who handle hazardous materials.

Maintain good housekeeping practices while work is underway, and remove debris in a timely manner.

Inform on-site contractors of required practices for management and disposition of wastes, discharges, and spills, and provide appropriate provisions in the contract to enforce these policies.

Prevent discharges of non-permitted wastewaters to the storm drain system.

Provide training for lab and contract employees, provide oversight of sub-contractors.

Protect nearby storm drains to minimize the chance of inadvertent disposal of residual paints or liquids.

Advise concrete drivers of the proper place to wash their trucks.

Clean the storm drain system in the immediate vicinity of the construction activity when it is completed.

SC12

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